

Education and training in public health

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Education and training in public health: is there progress in the European region?

Ulrich Laaser^{1,2}, Vesna Bjegovic-Mikanovic², Dejana Vukovic², Helmut Wenzel³, Robert Otok⁴, Katarzyna Czabanowska^{5,6}

1 Bielefeld School of Public Health, University of Bielefeld, Bielefeld, Germany

2 University of Belgrade, Faculty of Medicine, Centre School of Public Health and Management, Belgrade, Serbia

3 Independent Consultant, Konstanz, Germany

4 Association of Schools of Public Health in the European Region (ASPHER), Brussels, Belgium

5 Department of International Health, Faculty of Health, Medicine and Life Sciences, Care and Public Health Research Institute (CAPRI), Maastricht University, Maastricht, The Netherlands

6 National Institute of Public Health - PZH, Warsaw, Poland

Correspondence: Vesna Bjegovic-Mikanovic, University of Belgrade, Faculty of Medicine, Centre School of Public Health and Management, Dr Subotica 15, 11000 Belgrade, Serbia, Tel: +381 (11) 2643 830, Fax: +381 (11) 2659 451, e-mail: vesna.bjegovic-mikanovic@med.bg.ac.rs; bjegov@gmail.com

Background: The Association of Schools of Public Health in the European Region (ASPHER) is confronted with challenges to improve education for public health professionals. In this article, we attempt to answer the question: Did ASPHER members improve their organization and programmes to enable their graduates to acquire the competences to tackle the diverse areas of public health defined in the Ten Essential Public Health Operations (EPHOs)? **Methods:** ASPHER run two surveys among its membership: In 2011, 66 Schools and Departments of Public Health (SDPHs) took part (82.5%), while in 2015–16, 78 SDPHs (81.3%). The performance of graduates was estimated using a Likert scale. **Results:** In 2015–16, the SDPHs delivered 169 academic programmes (2.2 on average per SDPH). Among the SDPHs participating in both surveys, significant differences could not be determined, neither for the organization (except increasingly using social media) nor for teaching areas. The performance of graduates did not show significant differences except for the deterioration of EPHO-8 ('assuring sustainable organizational structures and financing'). However, the qualitative data revealed progressive dynamics regarding innovations in the organizational set-up, digitalization, teaching/training, introduction of new modules and research. **Conclusions:** The results generated do not allow us to state that the innovative elements introduced after the first survey in 2011 have had a clear impact reflected in the second survey carried out in 2015–16, but perhaps this is due to the need for a broader follow-up in order to objectify the potential consequences derived from the boost generated by the changes introduced.

Introduction

In 2010, the Lancet Commissions published 'Health professionals for a new century: transforming education to strengthen health systems in an interdependent world'¹ a landmark for the European Schools and Departments of Public Health (SDPHs). At the same time, the first questionnaire survey (Survey I) of the SDPHs in the European Region was prepared, which was run a year later (April to December 2011) and published in 2013.^{2,3} The authors summarized results as follows: 'In spite of the enormous fragmentation of the institutional infrastructure and the teaching/training capacities the harmonization of programme content and thinking based on the European Public Health Operations is impressive'. However, the authors stated also a lack of modernity regarding Continuing Education (CE) and the use of English in training.

The discussion initiated by the Lancet Commission continued with setting the first-time targets for public health education⁴ and culminated at the celebration of the 50th Anniversary of the Association of Schools of Public Health in the European Region (ASPHER) in Athens.⁵

ASPHER's slogan for the early two thousand has been 'Public health education for research and practice'. Since then, qualified research and evaluated practice took attention⁶ increasingly with a focus on social determinants^{7,8} and the perspective to reach the targets set in the Sustainable Development Goals (SDGs),⁹ especially SDG-3¹⁰ towards 2030.

Researchers, as well as practitioners, increasingly realize that to be successful, the political barriers have to be removed and permanent exchange with the decision-makers and stakeholders to be established.¹¹ Public health services do not stand alone and cannot define their roles without multi-professional orientation and interdisciplinary expertise.¹² To identify tasks, competences and targets requires a permanent discussion with the political sector resulting in continuing innovation.^{13,14} The 'Roadmap to professionalizing the public health workforce', developed by ASPHER on behalf of the WHO Office for Europe, gives the lead orientation for the next years.¹⁵

ASPHER is confronted with numerous and overwhelming challenges to improve education for public health professional leadership. Did ASPHER members improve their organization and programmes to enable their graduates to acquire the competences and skills to tackle the diverse areas of public health as defined in the Ten Essential Public Health Operations model?¹⁵ To answer this question, ASPHER organized a second survey (Survey II) in 2015–16. This article attempts to determine whether or not there was progress during this period of almost 5 years and whether innovations were implemented with the potential for permanent change.

Methods

The survey was executed between January 2015 and March 2016 (Survey II) in the same way as 2011 (Survey I). The online questionnaire for Survey II was made available by ASPHER with a few

modifications vs. Survey I.¹⁶ The questionnaire contains not only sections asking for quantitative answers but also questions on barriers and innovations in qualitative terms. It covers programmes, networks, EPHOs and requests for various comments.

Between the two surveys, the membership of ASPHER increased from 80 to 96 with approximately the same percentage participating, i.e. 66 or 82.5% and 78 or 81.3%. This analysis concentrates on the group of 48 SDPHs, which responded in both surveys. Tables with corresponding data sets are in [Supplementary annexes S1–S4](#), while with the full data sets for each survey in [Supplementary annex S6](#). The performance of graduates has been estimated by the SDPHs according to the 10 EPHOs of WHO^{3,17} and related competences for each EPHO, selected from ASPHER’s comprehensive grouping of over 450 competences.^{3,18,19} The respondents were requested to answer the question ‘What is your School’s/Department’s of Public Health output in transferring knowledge and skills to assure the best possible public health performance of your graduates?’ making use of a Likert score (5 = very high; 1 = not transferred) in both surveys. Also, we asked in Survey II for Likert scores regarding the essential area of generic and social-interpersonal competences.

To evaluate the significance of differences of the variables, we applied the V-square test, a chi-square test corrected for sample size,²⁰ as frequencies are rather small. The data analysis is done with TIBCO Software.²¹ We used the General Linear Models method for analysing main effects in MANOVA (first-order MANOVA). This approach allows examining the effects of multiple independent categorical factors on multiple variables (TIBCO). A factorial design was not applicable; therefore, interactive effects are not part of the analysis. Thirteen variables from [table 1](#) served as independent factors (see [Supplementary annex S5](#)).

A thematic approach served to analyze the qualitative data in the survey questionnaire related to barriers and innovations. Based on Levitt et al.,²² we scrutinized textual answers and comments for distinct terms being aware of our occupational pre-occupation as public health academics.

Results

In survey II, we find in total 170 Bachelor, Master and PhD programmes which meet the criterion of a minimal ECTS load as detailed in [Supplementary annex S1](#), out of them according to the

Table 1 Characteristics of the European Schools and Departments of Public Health (SDPHs)

Variables	Survey I% (N = 48)	◀ = ▶	Survey II% (N = 48)
1) University based SDPH	75.0	▶	83.3
2) Involvement in other programmes	47.7	▶	52.7
3) Lecturers from other programmes	91.7	◀	79.2
4) Active methods of learning (small groups, field work, etc.)	93.8	◀	81.3
5) Modules for continuing education	41.7	▶	58.3
6) Existence of computer lab(s)	85.4	◀	83.3
7) Regularly updated website	89.6	◀	85.4
8) Presentation at any social network	27.1	▶	50.0
9) Library specialized in Public Health	79.2	◀	68.8
10) Strong practice links established	70.8	◀	64.6
11) Technical assistance (last 3 years)	70.8	▶	72.9
12) Broad spectrum of public health research	85.4	◀	72.9
13) Research training of students	83.3	▶	87.5
14) Alumni surveys executed	47.9	▶	64.6
15) Ready to share experience	70.8	◀	58.3
16) Provided examples of best practice	58.3	◀	37.5
17) Interested in student mobility	75.0	◀	62.5

Note: The right arrow (▶) stands for improvement, whereas the left arrow (◀) denotes deterioration.

Bologna criteria 27 Bachelor (BSc) and 48 Master of Public Health (MPH) programmes. In addition, there are 8 Bachelor and 69 Master programmes on related topics and 18 doctoral programmes (PhD).

[Table 1](#) describes the profiles of the 48 SDPHs, which participated in both surveys. None of the differences shown is significant, except for presentations at social networks (variable 8 with $P=0.022$). Whereas seven parameters improved with a higher percentage in Survey II vs. I, 10 parameters decreased with lower percentages in Survey II. For the full data set and a graphical presentation of the data, see [Supplementary annex S2a](#) and [b](#). A general trend cannot be recognized.

[Table 2](#) shows the various subjects taught at European SDPH: none of the differences between the two surveys is significant, though, clearly positive trends are shown for the subjects of Informatics and Behavioural Sciences.

[Figure 1](#) compares the outputs for the competences necessary to perform EPHOs by their averaged Likert values. No improvement can be detected in the second survey; on the contrary, except for competences for the EPHO-6 and EPHO-10, competences for all other EPHOs have a negative tendency. However, none of the differences is significant, with the exception of competences for EPHO-8, where the rating of the second survey is significantly worse with $P=0.029$. The generic competences (item 11) with a relatively high Likert value of 3.8 are of particular interest and presented here the first time. Detailed information is presented in [Supplementary annex S4a](#) and [b](#).

The qualitative answers and comments in the questionnaire are summarized in [table 3](#) using a thematic approach.

The list of innovations comprises key areas of modernization with a focus on innovative modules, but it indicates also the main blockades regarding effective access to the decision-makers and stakeholders. Of special interest is the understanding of research as a key element of progress and acceptance of public health.

Discussion

Both ASPHER’s surveys provide valuable insight in educational performance of SDPHs in Europe and readiness of graduates for working in the field of public health by possessing competences related to EPHOs. Previous publications dealt either with specific EPHOs in a country context²³ or in a particular area of public health in Europe.²⁴ Although the number of public health programmes offered increased from 130 in 2011³ to 170 in 2015–16, the average per SDPH remained almost the same with 2.0 and 2.2 programmes thereof 1.0 respectively 1.2 programmes according to Bologna criteria. Obviously, the capacity in many SDPHs and/or the labour

Table 2 Subject areas offered by Schools and Departments of Public Health (SDPH) in the WHO European Region

Category	Survey I (N = 48)		Survey II (N = 48)	
	Number	%	Number	%
01. Epidemiology	45	93.8	42	87.5
02. Health systems management	44	91.7	43	89.6
03. Statistics	43	89.6	42	87.5
04. Health promotion	42	87.5	39	81.3
05. Health economics	42	87.5	43	89.6
06. Health policy	41	85.4	39	81.3
07. Environmental/occupational health	39	81.3	37	77.1
08. Prevention	37	77.1	35	72.9
09. Global health	37	77.1	36	75.0
10. Behavioural sciences	33	68.8	39	81.3
11. Informatics	32	66.7	36	75.0
12. Public health genomics	14	29.2	15	31.3

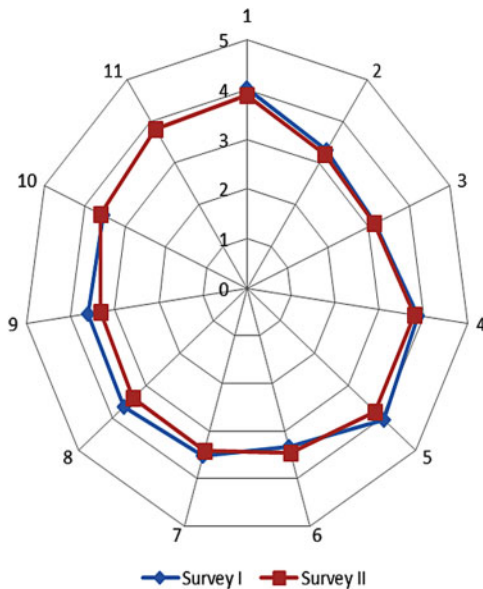


Figure 1 Performance of graduates according to the Essential Public Health Operations (EPHOs) as determined by Schools and Departments of Public Health (SDPHs) which participated in both surveys. Note: Numbers are corresponding to the groups of competences related to delivery of specific EPHOs (see [Supplementary annex S4a](#) and [b](#)). The group 11, assessed only in the Survey II, is independent and presents generic and social-interpersonal competences, which are cross-cutting and cover all EPHOs

market do not allow for more. The data in [Supplementary annex S1](#) reveal considerable diversity in the ranges of ECTS per programme and numbers of graduates per year, a reduction of heterogeneity is not visible.

This result leads to the central question of this article whether we see progress regarding structure and orientation, subject areas of lecturing and number of programmes, the performance of graduates related to the EPHOs, and most crucial question about the progress in the application of continual innovation. To answer this question, we focused on tables 2–4 containing data about 48 SDPHs, which participated in both surveys. Positive and negative trends are more or less balanced but not significant, with the only exceptions of presentations at social networks, which increased significantly from 27.1 to 50.0% at $P=0.0218$ ([table 1](#)). An area of concern is the diminishing interest in a regular update of websites and diminishing readiness to share experience and examples of best practice as well as a lower interest in student mobility. The lower access to public health libraries, however, may be connected to the increased use of private computer equipment of students (which would also explain the negative trend for utilization of computer labs in SDPHs). Likewise only the subject areas of behavioural sciences and informatics are lectured more often than in 2011. Similarly in [figure 1](#), the performance of graduates as measured by selected EPHO's competences did not change significantly between the two surveys except EPHO-8 (assuring sustainable organizational structures and financing) where the trend is significantly negative which may indicate even a weakening of the SDPHs' institutional standing²⁵ and corresponds to the qualitative results regarding barriers listed in [table 3](#). We tried a MANOVA with a generalized linear model using variables in [table 1](#) as independent factors and the EPHOs in [Supplementary annex S4](#) as dependent variables but did not see any contribution to explain the apparent standstill of further improvement between 2011 and 2015–16. This finding does not exclude long-term effects of up to 2020 when the survey should possibly be repeated (an example of the MANOVA on EPHO-8, the only significant—negative—change from 2011 to 2015–16 is added in [Supplementary annex S5](#)). However, in 2011, 63

European employers of public health graduates in 30 countries²⁶ stated that there is a significant difference between current and desired/needed levels of competence of employees to provide the required performance. Not unexpectedly, SDPHs estimated the exit competence level of their graduates to be higher than the level as determined by employers. At that time, the European employers suggested paying particular attention to the performance regarding EPHOs 3, 4, 9 and 10 (a slight upward trend can be observed only for EPHO-10). Furthermore, the European employers indicated the urgency for stronger marketing of programmes and activities of SDPHs to reach public health professionals, potential employers and the general public. This may be boosted by the increased use of social media in 2015–16.

Qualitative information is available from the answers to open-ended questions in the questionnaire. First, an impressive number of innovations and best practices have been indicated regarding the organizational set-up, e.g. the establishment of a Career Board or the introduction of Transversal Courses, supported by intense efforts to promote digitalization.

In the area of teaching and training, we observe an opening towards internationalization, increasingly offering—on the continent—programmes or modules in English, seeking international cooperation together with extending field practice and giving room for research. This trend may be an effect of ASPHER's Charter on Global Public Health of 2013²⁷ and the resulting Global Public Health Curriculum²⁸ developed in the framework of ASPHER's Working Group for Global Public Health.²⁹ Also, the Agency for Public Health Education Accreditation (APHEA)³⁰ related to ASPHER developed a strong drive towards global engagements.

Various SDPHs have introduced a long list of new modules in line with the increased teaching of behavioural sciences (+12.5%), informatics (+8.3%) and Public Health Genomics (+2.1%) ([table 2](#)). However, it is not clear to which degree these developments are guided by a more formalized discussion at the level of ASPHER. It rather seems that every SDPH discusses and introduces these elements on its own with little exchange with members of ASPHER.

A second focus is the discussion and removal of barriers to innovation and progress, almost exclusively prioritizing an effective and efficient contact with the national and international decision-makers and stakeholders.

A training seminar in communication competences should be considered as top priority focusing on how to overcome the resistance to recognize and acknowledge public health achievements—tobacco, alcohol, air pollution as risk factors and appropriate nutrition and physical activity as protective factors.^{31,32} The recently introduced Andrija Stampar Summer Educational & Tutoring School (ASSETS) of ASPHER potentially can cover this qualification area.³³

SDPHs should especially reconsider their priorities for WHO EPHOs 3, 4, 9 and 10 in close contact with potential employers of their graduates if they want to improve the chances of their graduates on the labour market and increase their employability. The level of performance is ranked lowest for EPHO-3 (preparedness and planning for public health emergencies).

Why do we observe this discrepancy between quantitative analysis and qualitative impressions? The main factor is undoubtedly the time passed since the second survey, i.e. 2016–20. Innovations implemented in spite of blockading barriers need time to take effect. It can well be assumed that innovations indicated in 2016 take effect only some years later, i.e. in the new cohorts of students benefitting from improvements introduced 2016. Therefore, a future survey in 2020, focusing on innovations and best practices would be of great interest.

In addition, it may be of interest to review and promote an old proposal namely an European Master of Public Health with students attending accredited modules in SDPHs in various European countries and receive in addition to the diploma at their national

Table 3 Answers and comments by the Schools and Departments of Public Health (SDPHs)

Subject area	Commented (integrated)
<i>Innovations and best practices (methodologies, content areas, research) implemented in the curricula</i>	
Organizational set-up	<ul style="list-style-type: none"> • Annual review of activities, • Postgraduate certificate in learning and teaching for all lecturers, • Formalized tutoring of students, • Career board to advise students and job dating, • Tutorials where students present their work, • Formalized student feedback and obligatory response by lecturers, • Introduction of problem-based learning, • Move from a modular-based system to a mix of modular and transversal courses
Online elements	<ul style="list-style-type: none"> • Computerized examination, • Virtual library, • MPH via e-learning, • Introduction of Moodle functionalities and screencast technologies, • Complete distance learning programme on public health and health management, • Blended learning, • Online seminars during thesis course and peer review of draft theses
Teaching and training	<ul style="list-style-type: none"> • Specialty course in English, • Promotion of international networks and combined programmes, • Increased number of hours for individual and/or group work, • Learning in small groups, field practice extended by 6 months, • Distinct number of elective courses, • Annual public health summer school, • Reduced emphasis on textbook style knowledge in favour of research.
Addition of new modules	<ul style="list-style-type: none"> • Advanced topics in biostatistics, • Bioinformatics, • Qualitative methods, • Basics of sociology, • Basics of psychology, • Public health ethics, • Non-communicable diseases, • Blood-borne diseases, • Public health genomics, • Public health microbiology, • Tobacco control, • Human rights, • Culture and health, • Global health, • Climate change, • Public health policy, • Public health strategy, • Health in low- and middle-income countries (LMIC), • Compulsory participation in a research project over three semesters, • National Registry of Occupational Diseases and Health Services for the entire country enabling planning and forecasting, • Research on alcohol abuse and sexual behaviour in young populations, • Research on health promotion in older populations.
Research	<ul style="list-style-type: none"> • Patient safety and risk management, • Health impact assessment, • Health literacy, • Integrated care, leadership in public health, • Public health in humanitarian crises, • Simulation of emergencies, • Community health with students based in remote rural areas, • Impact of austerity on health, sustainable development goals, • Modelling in health economics, • Total quality management, • Communication skills (communication laboratory), • Interaction with the general public.
<i>Barriers, if any, preventing the school being to achieve its potential in the area of public health</i>	
<ul style="list-style-type: none"> • The administration (ministries of health, of education, of finance) is not very cooperative/supportive, • Procedures are bureaucratic and staff is frequently changing, therefore effective and efficient access to the decision-makers is limited, • Furthermore, decision-making is often centralized in the capital and there is not enough time to intensify contacts proactively if located in the province (staff shortage), • Fully burdened with teaching and research, therefore lack of motivation for additional activities, • Results of the research are rarely used in the policymaking process and there is little intention on the side of the government to implement health policies in collaboration with the researchers, • The physical infrastructure is weak due to insufficient funding. 	

university an additional certificate confirming their European training. This concept refers back to a discussion in ASPHER during the first decade of this century and is complemented during the last years by European Public Health Master, M.Sc. offered by a consortium of European SDPHs.^{34–36} In this regard, a link to the One Health Initiative³⁷ should be formalized. Since this initiative is a collaborative, multi-sectoral and trans-disciplinary approach, which recognizes the interconnections between people, animals, plants and their shared environment, this is a key issue at present. Furthermore, ASPHER should intensify its ambassador programme where small authorized delegations of members of the Honours Committee³⁸ visit SDPHs to answer questions on the structural organization predominantly. In all these regards, the promotion of alumni organizations can be beneficial, but only two-third of SDPHs

conduct alumni surveys (+16.7%) (table 1). To strengthen the professional profile and status, the discussion on an ethical code of conduct for European public health professionals should be helpful.³⁹ Only if a public health or population ethics is defined and part of individual self-perception a profession can be identified and accepted.

As limitations of this second ASPHER survey remain at the first place, the long time passed since the collection of information in the field and the difficulty to identify causal factors responsible for the slow progress during the period between the two surveys. As standard multivariate techniques do not show interpretable results, to tackle this problem, we shall try in the next step to develop an appropriate methodology. Also it may be that the 48 SDPH participating in both surveys are an adverse selection; however,

the comparison of the 48 SDPH participating in both surveys with the 30 SDPH taking part only in Survey II does not reveal any significant difference in the structural variables (Supplementary annex S3), except for an interest in student mobility, which is significantly higher among the newcomers (87 vs. 63%, $P = 0.022$). Concerning the qualitative analysis, we isolated the identifiable terms from their embeddedness, which leaves some room for misinterpretation. However, as the comments overlap in many ways expressing the same messages, a sufficient coherence of this information is probable.

Overall, ASPHER, as the leading organization of the SDPHs, should strengthen its leadership role further and provide more central guidance in the areas of modernizing and standardizing curricula (especially concerning global and environmental health). Consequently, the community of SDPHs follow the path of internationalization/globalization, continue the discussion on European public health ethics, rethink a European Master of Public Health, revitalize the ambassador programme and advise on how to approach the political decision-makers and stakeholders. A well-planned European employer and alumni survey could help to complement the analyses in this article to make the vision right to enhance the health of the entire people by competent and devoted public health professionals acknowledged for their achievements.

Supplementary data

Supplementary data are available at *EURPUB* online.

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Conflicts of interest: None declared.

Key points

- Schools of public health in the European region show a great diversity in their programme formats and the number of graduates.
- Schools of public health indicate an impressive number of innovations and best practices which, however, may need more time to take effect on the competence profile of graduates.
- Researchers, as well as practitioners, increasingly realize that permanent exchange with the political decision-makers and stakeholders is essential

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Change in prevalence of self-harm from 2002 to 2018 among Norwegian adolescents

Anita J. Tørmøen¹, Martin Myhre¹, Fredrik A. Walby¹, Berit Grøholt², Ingeborg Rossow³

¹ Institute of Clinical Medicine, National Centre for Suicide Research and Prevention, University of Oslo, Oslo, Norway

² Institute of Clinical Medicine, University of Oslo, Oslo, Norway

³ Norwegian Institute of Public Health, Oslo, Norway

Correspondence: Anita J. Tørmøen, Institute of Clinical Medicine, National Centre for Suicide Research and Prevention, University of Oslo, Sognsvannsveien 21, Building 12, Oslo, Norway, Tel: +47 (0) 90 79 54 85, Fax: +47 22 92 39 58, e-mail: anita.tormoen@medisin.uio.no

Background: Self-harm is prevalent among adolescents and associated with mental health problems and negative life-events. Few studies have examined changes in its prevalence related to these factors. This study explored whether changes in prevalence of self-harm among adolescents had occurred, and to what extent changes in associated factors may have contributed. **Methods:** Two cross-sectional school-based surveys among adolescents (grades 8–10) in Norway were conducted in 2002 ($N = 5842$) and in 2017/18 ($N = 29\,063$). Past year prevalence of self-harm and identical variables on risk factors was analyzed in hierarchical logistic regression to examine whether and to what extent changes in self-harm correlates could explain periodical change in prevalence of self-harm. **Results:** An increase from 4.1% to 16.2% in self-harm prevalence was observed from 2002 to 2017/18. The increase was relatively larger among girls compared to boys and among 8th graders compared to 10th graders. Among the assessed risk factors for self-harm, depressive symptoms increased, while anti-social behavior, exposure to violent acts and drinking to intoxication decreased. The increase in depressive symptoms contributed to explain increase in self-harm. This contribution was outweighed by the decrease in other risk factors. **Conclusions:** Self-harm prevalence increased 4-fold among Norwegian adolescents over a 15-year period. While exposure to several risk factors for self-harm changed substantially in this period, these risk factors could in sum not explain any of the increase in self-harm.

Introduction

Self-harm affects millions of people and constitutes a major public health problem; life-time prevalence among adolescents is in the range between 10% and 20%.¹ Self-harm often starts and peaks in adolescence,² and is one of the most prominent predictors of

suicide.^{3,4} Self-harm is used in various ways and terms for non-fatal self-inflicted harm include 'Deliberate self-harm, Attempted suicide, Parasuicide and Self-injury'.⁵ Here, we define self-harm broadly; any form of deliberate self-injury or self-poisoning, regardless of motivation and intention to die. Self-harm in adolescents is associated with female gender, mental health problems and negative